

## **Pollution Prevention Unit Plan**

**Topic:** Pollution Prevention, focusing on pollutants from household and school sources

**Grade Level:** 6-8

**Instructional Setting:** Classroom with computer access. 5-40 students

### **Academic Outcomes/Student Objectives:**

Students will:

- Explain life cycle analysis and identify natural resources used and wastes produced during the generation of consumer products
- Explain pollution prevention and why it is the preferred practice (including water conservation, elimination of pesticide use, energy conservation, and reduction of household hazardous waste)
- Explain how pollution prevention options can be identified and used to reduce waste and prevent pollution (including water conservation, elimination of pesticide use, energy conservation, and reduction of household hazardous waste)
- Describe water uses and sources
- Define pesticides and their uses
- Explain why pesticides can be harmful to humans, pets, and the environment
- Define energy and its uses
- Explain renewable and nonrenewable energy sources
- Define Household Hazardous Waste and name its four characteristics
- Explain how Pollution Prevention concepts can be used to reduce household hazardous waste
- Explain where waste and pollutants are generated in one's school
- Conduct a pollution prevention survey of the school
- Apply pollution prevention principles in one's school.

**Process Skills Addressed:** research, observations, data collection, critical and analytical thinking and processing, development of solutions using criteria, observations, and scientific research, applying knowledge to real-life situation, identifying cause and effect, surveying, writing using comparison and contrast.

**Materials Needed:** See individual activities for particular materials necessary. None are out of the ordinary or expensive.

**Safety Precautions:** This is only a consideration if instructor takes students on a field trip.

**Total Time for Unit Plan:** 20 days at 45 minutes each

**Pre-Assessment:** Students complete a standardized pre-assessment that includes multiple choice and short constructed response questions.

**Post-Assessments: Service Project:** Students complete and audit of their school including the areas covered: water conservation, hazardous waste, energy conservation, and pesticides use. Afterwards, students develop an action plan to apply pollution prevention principles in their school.

**Standardized Assessment:** Students complete an extended version of the pre-assessment with the addition of an extended constructed response (a five-paragraph persuasive business letter).

## **Standards Covered:**

### **Colorado**

#### **SCEINCE STANDARD 1:**

Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.

In order to meet the standard, students will:

- Identify and evaluate alternative explanations and procedures;
- give examples of how collaboration can be useful in solving scientific problems and sharing findings.
- ask questions and stating hypotheses that lead to different types of scientific investigations (*for example, experimentation, collecting specimens, constructing models, researching scientific literature*);
- communicate results of their investigations in appropriate ways (*for example, written reports, graphic displays, oral presentations*);
- create a written plan for an investigation.

#### **SCEINCE STANDARD 3:**

Life Science: Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment. (*Focus: Biology—Anatomy, Physiology, Botany, Zoology, Ecology*)

In order to meet the standard, students will:

- explain the interaction and interdependence of nonliving and living components within ecosystems; and
- describe how an environment's ability to provide food, water, space, and essential nutrients determines carrying capacity.

#### **SCIENCE STANDARD 5:**

Students know and understand interrelationships among science, technology, and human activity and how they can affect the world.

In order to meet the standard, students will:

- describe how the use of technology can help solve an individual or community problem (*for example, using catalytic converters on automobiles to help reduce air pollution*); and
- describe how people use science and technology in their professions.

#### **SCIENCE STANDARD 6:**

Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.

In order to meet the standard, students will:

describe contributions to the advancement of science made by people in different cultures and at different times in history;

#### **READING AND WRITING STANDARD 2:**

Students write and speak for a variety of purposes and audiences.

In order to meet this standard, students will:

- write and speak for a variety of purposes, such as telling stories, presenting analytical response to literature, conveying technical information, and explaining concepts and procedures, and persuading;
- write and speak for audiences such as peers, teachers, and the community.

### READING AND WRITING STANDARD 3:

Students write and speak using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling.

In order to meet this standard students will:

- know and use correct grammar in speaking and writing;
- apply correct usage in speaking and writing;
- use correct sentence structure in writing; and
- demonstrate correct punctuation, capitalization, and spelling.

### READING AND WRITING STANDARD 4:

Students apply thinking skill to their reading, writing, speaking, listening, and viewing.

In order to meet the standard students will:

- make predictions, analyze, draw conclusions, and discriminate between fact and opinion in writing, reading, speaking, listening, and viewing;
- use reading, writing, speaking, listening, and viewing to define and solve problems;
- recognize, express, and defend points-of-view orally and in writing.

### READING AND WRITING STANDARD 5:

Students read to locate, select, and make use of relevant information from a variety of media, references, and technological sources.

In order to meet the standard students will:

- select relevant material for reading, writing, and speaking purposes;
- paraphrase, summarize, organize, and synthesize information;
- give credit for other's ideas, images, or information; and
- use information to produce a quality product.

### READING AND WRITING STANDARD 6:

Students read and recognize literature as a record of human experience.

In order to meet the standard students will:

- read literature to investigate common issues and interests.

## Utah

### LANGUAGE ARTS STANDARD: [4070 - 02](#)

Students use comprehension strategies during reading to actively construct the meaning of text.

4070-0201

Make text-to-text, text-to-self, and text-to-world connections.

- Relate text to other relevant texts.
- Relate text to life situations and experiences.
- Relate text to an event or issue in the world.

### LANGUAGE ARTS STANDARD: [4070 - 03](#)

Students use comprehension strategies after reading to reflect on, consolidate, and extend meaning.

4070-0301

Summarize and/or synthesize important information from text.

- Write a response.
- Discuss or debate important information.

- Confirm, revise, or reject predictions.
- Share responses to text, e.g., small group and whole class discussions, book clubs, visual presentations, written response, multimedia.
- Connect the text to another text, to a situation in life, and/or to an event or issue in the world.

#### LANGUAGE ARTS STANDARD: [4070 - 08](#)

Students use comprehension strategies before, during, and after viewing.

4070-0803

Evaluate and respond after viewing to reflect on, consolidate, and extend meaning.

- Summarize key ideas.
- Synthesize information to clarify thoughts, communicate ideas, and solve problems.
- Offer feedback.
- Evaluate the usefulness, reliability, and accuracy of information.

#### LANGUAGE ARTS STANDARD: [4070 - 09](#)

Students view functional, informational, and literary materials from different periods, cultures, and genres.

4070-0902

Demonstrate competency in viewing and interpreting INFORMATIONAL materials.

- Preview information presented visually by skimming and scanning promotional materials, e.g., advertisements in newspapers, introductory programs, documentary video covers, documentary movie trailers.
- Identify the organization of information presented visually, and use it to recall, construct, and predict, e.g., compare/contrast, cause/effect, question/answer, problem/solution, description, chronology, process.
- Scan for relevant information.
- Determine the accuracy, validity, and reliability of information viewed.
- Use the information gained visually and auditorily to create and share responses.

#### LANGUAGE ARTS STANDARD: [4070 - 10](#)

Students use process strategies before, during, and after composing.

4070-1002

Use composing strategies to construct a written draft.

- Establish a main idea or identify a central theme for writing.
- Select organizational pattern(s) to structure information, e.g., comparison/contrast, cause/effect, question/answer, problem/solution, description, chronology, process.
- Elaborate ideas through the use of detail, e.g., statistics, examples, illustrations, photos, charts, graphs, tables.
- Generate additional ideas as needed.
- Use information problem-solving skills, i.e., The Big Six: task definition, information-seeking strategies, location and access, use of information, synthesis, evaluation.

4070-1004

Edit text to conform to the conventions of standard English that include capitalization, punctuation, usage, and correct spelling.

- Identify and correct errors in usage, e.g., misplaced modifiers, unnecessary fragments, run-on sentences, incorrectly combined sentences, incorrect subject-verb agreement, incorrect adverb usage, incorrect use of the possessive case, incorrectly applied present and future tenses.
- Identify and correct errors in capitalization, e.g., sentence beginning, proper adjectives and nouns, titles, proper noun phrases.
- Identify and correct errors in punctuation, e.g., appropriate end punctuation, introductory comas, commas in a series, quotation marks with titles of chapters, use of unnecessary commas, capitals with historic periods.

- Identify and correct misspellings of words in the context of sentences.
- Evaluate own and others' writing according to standard language usage.

4070-1005

Participate in post-writing strategies to make writing public.

- Prepare finished products for publication, e.g., for school assignments in language arts and other content courses, on electronic bulletin boards, for public display, in school and commercial publications.
- Share with peers, teachers, family members, and others

#### LANGUAGE ARTS STANDARD: [4070 - 11](#)

Students write functional, informational, and literary texts for various purposes, audiences, and situations.

4070-1102

Demonstrate competency in writing INFORMATIONAL text.

- Use writing process strategies to construct informational text, e.g., school reports, essays, magazine and newspaper articles.
- Use text features to indicate organization, e.g., headings, sub headings, other visual information.
- Select organizational pattern(s) to indicate important information, e.g., comparison/contrast, cause/effect, question/answer, problem/solution, description, chronology, process.
- Use accurate, valid, and reliable information.
- Use a mix of types of text organization as necessary.

#### SCIENCE STANDARD: [3520 - 08](#)

Students will investigate the interdependence of organisms with each other and with their environment.

3520-0802

Analyze the effects of human activities on matter cycles and energy flow.

- Relate fossil fuel use and the use of alternate energy sources to matter cycles and energy flows.
- Analyze and assess personal choices in relation to matter cycles and energy flow.
- Observe and document the impact of people on a natural cycle, interpret the results, and predict long-term effects.
- Formulate an opinion and defend it on an issue regarding human impacts on a natural cycle (e.g., fossil fuels, fertilizers, recycling).

3520-0803

Analyze the influence of humans in an ecosystem.

- Infer from data the impact of human population growth in an ecosystem.
- Predict the long-range environmental impacts of specific practices and policies.
- Predict the long-term social impacts of specific practices and policies.
- Construct a personal plan for resource conservation.
- Evaluate how technology can create and mitigate damage to the environment.
- Collect information on local, national, and/or global practices that affect ecosystems and evaluate the scientific accuracy of the collected information. Present a position on the basis of this information.
- Investigate and discuss career opportunities that have a direct impact on the environment.

#### SCIENCE STANDARD: [3600 - 06](#)

Students will analyze relationships between Earth's crust and other Earth systems.

3600-0602

Relate global and local geologic resources to the biosphere.

- Research and analyze an issue related to the use of geologic resources (e.g., formation rate vs. depletion rate of fossil fuels, mining in Utah, automobile pollution, coal burning power plants).